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By Dr. Catherine Yuk-ping Lo - on January 10, 2018

AMR is jeopardizing both human and animal health, concerted coordination mechanism between the human and animal health sectors is yet to be seen in India.

Antimicrobial resistance (AMR) refers to the ability of microbes to become resistant to antimicrobial drugs, sometimes referred to as "superbugs." AMR is not a new phenomenon; Alexander Fleming, the father of penicillin, had warned in his Nobel Prize speech in 1945, that bacteria could become resistant to human-invented drugs. Following Darwin's idea of evolution, the development of resistance is in fact a normal evolutionary process for microorganisms, but the selective pressure exerted by widespread use and misuse, and even abuse of antimicrobial drugs, in both therapeutic and non-therapeutic ways, accelerates it.

Unregulated and overuse of antibiotics, in both human and animal sides, is the prime reason for the looming AMR problems. A report entitled "The State of World Antibiotics 2015" demonstrated that India was the world's largest consumer of antibiotics for humans (12.9 billion antibiotic pills) in 2010. In comparison, China consumed 10 billion pills and the U.S 6.8 billion. Despite the fact that insufficient access to effective and affordable antibiotics kills more children in India than does drug resistance, a study reported by Gardiner Harria in *New York Times* in 2014 revealed that more than 58,000 infants died in 2013 owing to bacterial infections that were resistant to most known antibiotics. Antibiotic use as growth promoters in animal livestock has likewise been rampant in India; it ranks fourth among the 10 nations in terms of antibiotic usage in animal farm. Without prompt government interventions, antibiotic use in animal livestock will further increase by 82 percent in India by 2030.

Predicting that India would become the second or the third largest economy by 2050, Lord Jim O'Neill warned the country will fail to attain this "exciting potential" if it does not scale

up its effort to tackle the emerging AMR problem. Based on the 2016 report entitled *Infection Prevention, Control and Surveillance: Limiting the Development and Spread of Drug Resistance*, AMR would claim an estimated one million lives in India by 2050, thereby requiring swift and appropriate responses in the Indian antibiotic regime.

Compared with the immediate challenges of HIV/AIDS, TB, and also malaria, AMR nevertheless has been a low priority area in most developing as well as many developed countries.

The early recognition of the AMR as an emerging public health problem can be dated back to 2000 when former World Health Organization (WHO) director-general Dr Gro Harlem Brundtl and framed AMR as a global crisis. The precedence of bio-terrorism after the September 11 attacks nonetheless overshadowed the 2000 discourses and the subsequent release of the *WHO Global Strategy for Containment of Antimicrobial Resistance* and its related campaigns in 2001. The early efforts were not successful in calling for urgent global responses and budget allocation in dealing with the threats posed by AMR.

The discovery of the New Delhi metallo-β-lactamase (NDM-1) gene in India in 2008 and mobilized colistin resistance (MCR-1) gene in China 2015 has turned the tide on the global AMR responses. It is believed that the two genes would prompt the world ushering in "the doomsday scenario of a world without antibiotics," for NDM-1 causes the bacterium to produce an enzyme that neutralizes the activities of antibiotics, whereas MCR-1 provides bacteria with resistance to colistin, a last-line antibiotic. The urgency in dealing with AMR was then acknowledged when the WHO Member States endorsed a Global Action Plan on Antimicrobial Resistance (GAP-AMR) in the 68th World Health Assembly (WHA) in May 2015, calling for countries to collaborate to slow down AMR and avoid a post-antibiotic era. Many countries have prioritized AMR, since then. India is no exception. In line with the Global AMR Action Plan, a comprehensive AMR National Action Plan 2017-21 has been formulated in India, identifying six strategic priorities to combat the problem of AMR. The Ministry of Health & Family Welfare (MoHFW) has likewise identified AMR as one of the top 10 priorities for the Ministry's collaboration work with the WHO for 2018-2019. The affirmation of the commitment to deal with AMR problems is further observed when Prime Minister Shri Narendra Modi pinpointed the Indian AMR problems in his radio programme "Mann ki Baat."

Rigorous actions have been taken to address the human usage of antibiotics; the list of Schedule H has been expanded to restrict the over-the-counter sales of certain third-or-fourth generation antibiotics in India. Nevertheless, equivalent countermeasures or level of awareness of AMR was not found on the animal side in the country; farmers can still easily purchase antibiotics for growth promotion or disease prevention of animal livestock without prescriptions provided by vets. Taking into account that AMR is jeopardizing both human and animal health, concerted coordination mechanism between the human and animal

health sectors (i.e., between the MoHFW and Ministry of Agriculture and Farmers Welfare, or between medical doctors and vets) is yet to be seen in India.

AMR is happening now; it is not a country specific issue but a global concern that is threatening global health security. Based on the 2016 *World Economic Forum* report, to date, resistant pathogens cause about 700,000 deaths every year. Without taking immediate and appropriate actions, 10 million people, more than cancer deaths today, will be killed per year by 2050. Together with effective coordination between human and animal health sectors, advanced surveillance and reporting systems, a more rigorous use of antibiotics or alternatives, as well as the development of new chemical and biological protocols to address infections are thus necessary to mitigate the threat posed by AMR in India and the globe.

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